DOCUMENT RESUME

ED 281 168 CS 008 777

AUTHOR Taylor, Vivian Baker; Rosecrans, Deborah
TITLE An Investigation of Vocabulary Development via Computer-Assisted Instruction (CAI).
PUB DATE 86
NOTE 20p.
PUB TYPE Reports - Research/Technical (143)

EDRS PRICE MF01 Plus Postage. PC Not Available from EDRS.
DESCRIPTORS Basic Skills; College Students; Comparative Analysis; *Computer Assisted Instruction; Decoding (Reading); Developmental Studies Programs; Higher Education; Reading Comprehension; Reading Processes; *Reading Research; *Remedial Reading; Skill Development; *Teaching Methods; Two Year Colleges; *Vocabulary Development

ABSTRACT

A study investigated the effects of computer-assisted instruction on the vocabulary development of college students enrolled in a developmental reading program at a two-year college of a metropolitan, midwestern university. The subjects were 41 entry level students, 98% of whom had never used computers as an instructional tool. The students were in three intact classes--a control group that received only traditional instruction, an experimental group receiving traditional instruction and individualized, in-class, computer-assisted instruction; and an experimental group receiving traditional instruction in class and computer-assisted instruction in a laboratory outside of the class structure. All experimental subjects used "Kernel," a computer program designed to supplement their regular classroom reading materials and to remediate deficiencies in phonic analysis, structural analysis, contextual analysis, and basic comprehension skills. All subjects were pretested and posttested with the vocabulary subtest of a standardized reading test. Results revealed that the application of computer-based instruction did not improve vocabulary skills among the subjects. In addition, the two experimental groups did not achieve scores significantly different from each other. (Tables and references are appended.) (FL)

****
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
****

ED281168

An Investigation of Vocabulary Development Via Computer-Assisted Instruction (CAI)

U.S. DEPARTMENT OF EDUCATION
Office of Educational Research and Improvement
EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)
X This document has been reproduced as received from the person or organization originating it.
☐ Minor changes have been made to improve reproduction quality.
• Points of view or opinions stated in this document do not necessarily represent official OERI position or policy.

Dr. Vivian Baker Taylor
Assistant Professor of Reading
Jackson State University
P. O. Box 17042
Jackson, Mississippi 39217

and

Dr. Deborah Rosecrans
Director of Reading Center
University College M.L. 203
University of Cincinnati
Cincinnati, Ohio 45221

"PERMISSION TO REPRODUCE THIS MATERIAL IN MICROFICHE ONLY HAS BEEN GRANTED BY

Vivian B. Taylor

TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)."

Abstract

The purpose of this study was to investigate the effects of computer-assisted instruction on the vocabulary development of college students enrolled in a developmental reading program. The study utilized an experimental design consisting of three groups of entry level college students. One group comprised the control group and the other two were used as experimental groups exposed to treatment X (computer-assisted instruction). The vocabulary subtest of the Nelson-Denny Reading Test was employed in pre and post test form to yield comparative data. Scores were analyzed using analysis of covariance.

CS 008 777

Vita

Dr. Vivian Taylor, the principal author, is assistant professor of Reading at Jackson State University, Jackson, Mississippi. She has taught reading in public school and in higher education for seven years. Her articles have been published by the College Board in New York, The Institute for Services to Education in Washington, D.C., and The Kentucky Journal of Reading.

Dr. Deborah Rosecrans is Director of the Reading and Study Skills Center at the University of Cincinnati, Cincinnati, Ohio. She uses computers as a major tool for instruction in the design of the reading laboratory. She has published several articles and has presented at local, state, regional and national meetings.

AN INVESTIGATION OF VOCABULARY DEVELOPMENT VIA COMPUTER-ASSISTED INSTRUCTION (CAI)

Introduction

There has been a continuous quest among reading and content teachers to ascertain the most efficient modality for the teaching of vocabulary skills. Dale, Razik and Petty (1973) compiled a bibliography of vocabulary studies including unpublished theses and dissertations from 1874 through 1972 that sought to shed light upon this issue. The relative effectiveness of one method in comparison to another seems equivocal; thus, the quest continues.

Dale and O'Rourke (1971) assert that vocabulary development is concept development, therefore instruction should make use of the relationship between words and concepts in order to apply prior knowledge of vocabulary to learning new words. Dupuis and Snyder (1983) share this view and posit that vocabulary development is very crucial since it is tied to basic concepts in any content course.

According to Trillin (1980), the best way to teach vocabulary skills at the college level is a controversial issue. Because students have such varied backgrounds, she posits, skills needed demand instructional models that address the students' individual needs.

Crist (1975) from her experience with college students postulates:

> Working with a group of academically disadvantaged college freshmen in a developmental reading course I find their most frantic search for words to express even the most basic concept to be one of their most pressing needs (p. 147).

To further investigate strategies for teaching vocabulary, the researchers attempted to employ and test an innovative technological

method which shows great potential for enhancing college students' vocabulary development and for addressing their individual needs--computer-assisted instruction (CAI). It has commonly been used to supplement traditional instruction and to provide drill-and practice of specific skills (Edward et al., 1975). Since the literature suggests that students need supplementary, instructional materials that will provide individualized practice to overcome specific reading difficulties (Schubert and Torgerson, 1968), CAI seems to be a plausible alternative.

To test the effectiveness of CAI applied to the vocabulary development of college students, an experimental study was conducted. The following null hypothesis was derived and tested at the .05 level of significance to yield comparative information regarding differences among groups on the vocabulary variable: There is no significant difference among vocabulary test scores of CAI students and non-CAI students after adjusting for pretest differences.

The research design, setting and sample, methodology, statistical analysis, findings and conclusions are summarized below.

Setting and Sample

The setting was a two year college of a mid-western university located in a metropolitan area, operating on an open admissions policy. The college offers a wide range of technical and humanistic programs, and awards associate degrees of Arts, Science, and Applied Business. The diverse student population that it serves represents several cultural, social and economic backgrounds.

The sample was selected from a population of entry level college students enrolled in Effective Reading and Study, a course offered in the Developmental Reading Program. The course is a three quarter sequential course designed to enhance students' basic skills in reading and study. Two credit hours are awarded to students who satisfactorily meet course requirements.

Fifty-two students initially consented to participate in the study along with one instructor, a reading specialist with six years of college teaching experience. Because of attrition and absences from the posttest, the final sample was comprised of forty-one students. One student withdrew for reasons not disclosed.

There were fourteen males, and twenty-seven females ranging from ages eighteen to twenty-five. All of the students comprising the sample demonstrated deficiencies in basic reading skills as measured by the Degrees of Reading Power Test, an instrument used to screen and place students within the Reading Program.

Ninety-eight percent of students never used any form of computers as an instructional tool prior to their participation in the study. This information was obtained from a questionnaire completed by each of the subjects.

The sample was distributed across three sections of Effective Reading and Study which were taught by the same instructor in an effort to control for teacher influence variables.

Table 1 illustrates a distribution of the sample by sex. Table 2 illustrates a breakdown of the sample by classes.

Research Design

The study utilized a three groups, pretest-posttest experimental design. This design was selected because the effects of the experimental treatment could be established by comparing a group which experienced treatment X with one which did not. The design permitted the answering of the question guiding the research: What effects does CAI have upon the vocabulary achievement of college students enrolled in a developmental reading program?

Intact groups were used since it was not possible to assign subjects at random or to use matching procedures.

To ensure that the experimental treatment accounted for changes in the dependent variable, extraneous variables were controlled as much as possible. Teacher influence variables were controlled by using the same teacher to instruct all three groups involved in the study. The statistical analysis, analysis of covariance, was also a source of control for intersubject differences.

Methodology

During the fall quarter, three sections of Effective Reading and Study were identified for the purpose of this study. The sections were intact and were selected arbitrarily. One section consisting of eleven students was used as a control group; a section comprised of sixteen students formed one experimental group; and the final section consisting of fourteen students formed a second experimental group.

All students in each of the three groups were pretested using the vocabulary subtest of the Nelson-Denny Reading Test, pretest

form. The test was administered at the beginning of the fall quarter according to directions outlined in the test manual.

The control group attended class three days per week for a fifty minute period and received traditional instruction including lecture, small group, large group and individualization. The first experimental group, consisting of sixteen students, attended class three days per week and received twenty-five minutes of traditional instruction within the classroom setting, and the remaining twenty-five minutes were spent in the computer-assisted instructional laboratory where students received reading instruction via computers in a very structured, individualized manner. The second experimental group comprised of fourteen students, attended class three days per week for a fifty minute period receiving traditional instruction in the same manner as that of the control group, but also attended the computer lab outside of the class structure (free-time) a minimum of one hour per week.

Students in both experimental groups used "Kernel," a computer program designed to supplement regular classroom reading materials and remediate deficiencies in phonic analysis, structural analysis, contextual analysis, and basic comprehension skills.

The computer laboratory was accessible to students in the second experimental group every Monday from 8 a.m. to 8 p.m. and Tuesday through Friday from 8 a.m. til 5 p.m. This allowed ample time for the students to use computer materials during their free-time.

Ten computer terminals were made available for use, and students were assisted by the CAI director and trained proctors. The computer printout revealed that the first experimental group consisting of sixteen students spent a total of seventy-eight hours and fifty-nine seconds on the computer terminals. Experimental group two spent a total of fifty-one hours and twelve seconds on the computer terminals. The control group did not use CAI.

With the exception of the CAI Lab work, all three groups covered the same materials and topics and received identical instruction in class. The duration of instruction was seven weeks for each group.

Following the instructional period, all students were posttested using the vocabulary subtest of Nelson-Denny Reading Test, posttest form.

Statistical Analysis

Analysis of covariance was used to analyze the data. The pretest scores were used as covariants of the posttest scores. "Analysis of covariance is a method for analyzing differences between experimental groups on the dependent variable after taking into account any initial differences between the groups on the pretest measures or any other relevant independent variables" (Ary et al., 1972, p. 224). It is often used when intact groups must be used.

Before employing the analysis of covariance, an analysis was made to determine the correlation between pre and posttest scores on the vocabulary variable. This was necessary in order to satisfy

the assumption made by analysis of covariance (test scores must be homogeneous and linear). The results of Pearsons Product Moment Correlation Coefficient indicated that pre and posttest scores were correlated at the .05 level of significance. Table 3 illustrates the slope (Beta) and correlation for the vocabulary scores.

Scores for each of the three groups were analyzed separately. For each, mean scores and standard deviations were determined for both the pre and posttests.

Tables 4 and 5 present the data analysis for the vocabulary scores. Table 4 displays the adjusted posttest means with the covariate (pretest) mean. Table 5 illustrates a comparison among the groups.

Table 4 reflects an adjusted mean of 18.15 for experimental group one, 19.50 for experimental group two, and 21.60 for the control group on the vocabulary measure. This indicates that the control group (non-CAI users) attained a higher mean score than did the two experimental groups. Thus, the effect of the experimental treatment was in the opposite direction of the desired effect. This table also suggests that variance tended to decrease over time for the two experimental groups as noted in the standard deviation columns.

Table 5, the comparison of groups on the vocabulary measure indicated the F-value of 3.41 for 2 degrees of freedom between groups and 37 degrees of freedom within groups. This reflected an overall significant difference among means at the .05 level of significance. Thus, the null hypothesis was rejected.

To determine which difference contributed to the significance, a planned comparison (Kerlinger, 1973) was conducted comparing variance. The results of the comparison is displayed in Table 6.

Table 6 indicates no significant difference between the two experimental groups (one and two), nor is group two significantly different from group three (control group). However, the table does indicate a significant difference between experimental group one and the control group with the control group attaining the highest mean (see Table 4).

Findings and Conclusions

The results of this study revealed that the application of computer-assisted instruction did not improve vocabulary skills among entry level college students enrolled in a developmental reading program. The data analysis did indicate a significant difference among the three groups of scores, but not in the direction of the desired effect. The control group (non-CAI users) attained higher mean scores according to the data analysis as compared to both experimental groups.

Further, it was revealed that the two experimental groups did not differ significantly from each other. Students receiving CAI in a structured manner were not different from those receiving CAI during their free time (unstructured manner).

Several research studies have documented the positive effects of computer-assisted instruction in teaching reading skills (Atkinson and Fletcher, 1972, also Hansen et al., 1971). This study

however, did not yield results to attest to these positive effects. It should be noted that the findings of the study may have been influenced by factors other than the absolute intervention of CAI. Obviously class size is a factor which would directly affect the results since groups were unequal. Maturation is also a factor to take into consideration.

Future research could benefit from a replication of the study to see if the tendencies found in this study are the same.

TABLE 1

DISTRIBUTION OF SAMPLE BY SEX

Group	Males	Females
Experimental 1	5	10
Experimental 2	5	9
Control 3	4	8
Total	14	27

TABLE 2

SAMPLE POPULATION BY CLASSES

Class	Original Number	Final Number
A	18	16
B	21	14
C	13	11
Total	52	41

TABLE 3

CORRELATION BETWEEN PRETEST AND POSTTEST MEASURES OF VOCABULARY, COMPREHENSION AND TOTAL READING

Variables	Slope (Beta)	Correlation (r)
Vocabulary	.76	.34**

** $p < .05$

TABLE 4

MEAN PRE-NELSON-DENNY, MEAN AND ADJUSTED MEAN FOR DEPENDENT VARIABLE VOCABULARY

Groups	NELSON-DENNY PRETEST			NELSON-DENNY POSTTEST		
	N	Mean	SD	Obtained Mean	SD	Adjusted Mean
Exp. 1	14	18.42	5.40	20.00	5.02	18.15
Exp. 2	16	16.43	7.16	19.68	6.59	19.50
Control 3	11	13.09	6.34	19.00	6.76	21.60

TABLE 5

ANALYSIS OF COVARIANCE:
COMPARISON OF GROUPS ON NELSON-DENNY - VOCABULARY

	df	Mean Squares	F	P
Between Groups	2	33.04	3.41	.0437**
Within Groups	37	9.68		

** $p < .05$

TABLE 6

RESULTS OF PLANNED COMPARISONS FOR NELSON-DENNY - VOCABULARY MEASURE

Contrast	df	F	p
1 and 2	1	1.37	.2487
1 and 3	1	6.80	.0131**
2 and 3	1	2.84	.1003
average treatment	1	5.83	.0208**

** $p < .05$

References

Ary, Donald; Jacob, Lucy; and Razavieh, Asghar. Introduction to research in education. New York: Holt, Rinehart, and Winston, 1972.

Atkinson, Richard and Fletcher, John. Teaching children to read with computers. The Reading Teacher, 1972, 25, 319-327.

Crist, Barbara. One capsule a week - a painless remedy for vocabulary ills. Journal of Reading, 1975, 19, 147-149.

Dale, Edgar and O'Rourke, Joseph. Techniques of teaching vocabulary. California: Field Education, 1971.

Dale, Edgar; Razik, Taher; and Petty, Walter. Bibliography of vocabulary studies. 5th ed. Ohio: Ohio State University, 1973.

Dupuis, Mary and Synder, Sandra. Develop concepts through vocabulary: A strategy for reading specialists to use with context teachers. Journal of Reading, 1983, 297-305.

Edwards, Judith; Norton, Shirley; Taylor, Sandra; Weiss, Martha; and Dusseldorph, Ralph. How effective is CAI? a review of the research. Educational Leadership, 1975, 33, 147-153.

Hansen, D. N. et. al. A rural county computer related instructional technology project. End of Project Report, CAI Center, Florida State University, Tallahasee, Florida, August 1, 1971.

Nelson, M. J. and Denny, E. C. Examiner's Manual: The Nelson-Denny Reading Test. Boston: Houghton Mifflin, 1960.

Kerlinger, Fred. Foundations of behavioral research. New York: Holt, Rinehart and Winston, Inc., 1973.

Schubert, Delwyn and Torgerson, Theodore. Improving the reading program. Iowa: William Brown Co., 1968.

_____. Degrees of Reading Power Test. New York: The College Board, 1978.